

WHAT IS CLAIMED IS:

1. A ceramic honeycomb structure comprising a ceramic honeycomb body comprising axial grooves on its periphery and cell walls constituting a larger number of flow paths inside said grooves, and a peripheral wall layer  
5 covering said grooves, wherein there are stress release portions at least partially in said peripheral wall layer and/or between said peripheral wall layer and said grooves.
2. The ceramic honeycomb structure according to claim 1, wherein said stress release portions are voids provided in said peripheral wall layer such  
10 that they are open on a periphery thereof.
3. The ceramic honeycomb structure according to claim 2, wherein the total length of said voids is equal to or larger than the full length of said ceramic honeycomb structure.
4. The ceramic honeycomb structure according to claim 2 or 3, wherein  
15 voids provided in said peripheral wall layer are in the form of a slit.
5. The ceramic honeycomb structure according to any one of claims 2 to 4, wherein voids provided in said peripheral wall layer are cracks in said peripheral wall layer.
6. The ceramic honeycomb structure according to claim 1, wherein said  
20 stress release portions are voids provided between said peripheral wall layer and said grooves.
7. The ceramic honeycomb structure according to claim 6, wherein the number of grooves having said voids between said peripheral wall layer and said grooves is 5% or more of the number of the total grooves.
- 25 8. A ceramic honeycomb structure comprising a ceramic honeycomb body comprising axial grooves on its periphery and cell walls constituting a larger number of flow paths inside said grooves, and a peripheral wall layer covering said grooves, wherein the thermal expansion coefficient of said

peripheral wall layer is smaller than those of said cell walls in a radial direction.

9. The ceramic honeycomb structure according to claim 8, comprising stress release portions at least partially in said peripheral wall layer and/or  
5 between said peripheral wall layer and said grooves.

10. The ceramic honeycomb structure according to claim 9, wherein said stress release portions are voids provided in said peripheral wall layer such that they are open on a periphery thereof.

11. The ceramic honeycomb structure according to claim 10, wherein the  
10 total length of said voids is equal to or larger than the full length of said ceramic honeycomb structure.

12. The ceramic honeycomb structure according to claim 10 or 11, wherein voids provided in said peripheral wall layer are in the form of a slit.

13. The ceramic honeycomb structure according to any one of claims 10  
15 to 12, wherein voids provided in said peripheral wall layer are cracks in said peripheral wall layer.

14. The ceramic honeycomb structure according to claim 9, wherein said stress release portions are voids provided between said peripheral wall layer and said grooves.

20 15. The ceramic honeycomb structure according to claim 14, wherein the number of grooves having said voids between said peripheral wall layer and said grooves is 5% or more of the number of the total grooves.

16. A ceramic honeycomb structure comprising a ceramic honeycomb body comprising axial grooves on its periphery and cell walls constituting a  
25 larger number of flow paths inside said grooves, and a peripheral wall layer covering said grooves, said ceramic honeycomb body being obtained by removing a peripheral wall before firing.

17. The ceramic honeycomb structure according to any one of claims 1 to

16, wherein said peripheral wall layer is formed before or after firing said ceramic honeycomb body.

18. The ceramic honeycomb structure according to claim 17, wherein said ceramic honeycomb structure has an isostatic strength of 1.5 MPa or more.

5 19. The ceramic honeycomb structure according to any one of claims 1 to 18, wherein said cell walls have a porosity of 50 to 80% and an average pore size of 10 to 50  $\mu\text{m}$ .

20. A ceramic honeycomb structure comprising a ceramic honeycomb body comprising axial grooves on its periphery and cell walls constituting a  
10 larger number of flow paths inside said grooves, and a peripheral wall layer covering said grooves, wherein said peripheral wall layer is made of a mixture comprising amorphous silica particles and an amorphous oxide matrix.

21. The ceramic honeycomb structure according to claim 20, wherein said is formed from colloidal silica and/or colloidal alumina.

15 22. The ceramic honeycomb structure according to claim 20 or 21, wherein said peripheral wall layer has a composition comprising 100 parts by mass of amorphous silica particles and 2 to 35 parts by mass of an amorphous oxide matrix.

20 23. A method for producing a ceramic honeycomb structure comprising a ceramic honeycomb body comprising axial grooves on its periphery and cell walls constituting a larger number of flow paths inside said grooves, and a peripheral wall layer covering said grooves, comprising the steps of shaping a soft ceramic material by extrusion and drying it to form a ceramic honeycomb green body, removing a peripheral wall from said ceramic honeycomb green  
25 body to form a ceramic honeycomb body, and forming said peripheral wall layer on said ceramic honeycomb body before or after firing said ceramic honeycomb body.

24. The method according to claim 23, wherein said green body is fired in

a state where said ceramic honeycomb green body is placed on a table with its one opening end abutting said table, and a portion of said green body adjacent to said table is then cut.

25. The method according to claim 24, wherein said peripheral wall is removed in a green body portion adjacent to said table according to a dimensional change predicted by firing.

26. The method according to claim 23 to 25, wherein said ceramic honeycomb body is made of cordierite, and wherein said peripheral wall layer is formed by a coating material comprising 100 parts by mass of amorphous silica particles and 2 to 35 parts by mass (on a solid basis) of colloidal silica and/or colloidal alumina.

27. A coating material for forming a peripheral wall layer of a ceramic honeycomb structure, comprising 100 parts by mass of amorphous silica particles and 2 to 35 parts by mass (on a solid basis) of colloidal silica and/or colloidal alumina.